

Unit 4

Day 5

Finding a Specific Term

Summary of Binomial Expansion of $(x + y)^n$ Patterns:

1. There are $n + 1$ terms in the expansion.
2. The first term is x^n , and the last term is y^n .
3. In each succeeding term, the exponent on x decreases by 1, and the exponent of y increases by 1.
4. The sum of the exponents on x and y in any term is n .
5. The coefficient of the term with $x^r y^{n-r}$ or $x^{n-r} y^r$ is $\binom{n}{r}$.

For reference:

5)

$$(x-2y)^6$$

$$\begin{aligned} & \binom{6}{0}x^6 + \binom{6}{1}x^5(-2y) + \binom{6}{2}x^4(-2y)^2 + \binom{6}{3}x^3(-2y)^3 + \binom{6}{4}x^2(-2y)^4 + \\ & \quad \binom{6}{5}x(-2y)^5 + (-2y)^6 \\ & x^6 - 12x^5y + 60x^4y^2 - 160x^3y^3 + 240x^2y^4 - 192xy^5 \\ & \quad + 64y^6 \end{aligned}$$

Finding the k^{th} term of $(x+y)^n$.

formula: $\binom{n}{r} x^{n-r} y^r$

$r = k - 1$

1) Find the third term of $(x^4 + 4y^2)^8$

$k=3$

Substitute:

$8C_2$

Evaluate:

$\rightarrow (28)(x^{24})(16y^4)$

$448x^{24}y^4$

$r = 3 - 1$

$n = 8$

1) Find the 6th term of $(x-2y)^{12}$

$r =$

$n =$

Substitute: $\binom{12}{5} x^7 (-2y)^5$

Evaluate: $-25344x^7y^5$